

HR-148 PAVEMENT WEAR AND STUDDED TIRE USE IN IOWA

Key Words: studded tire, pavement wear, maintenance

ABSTRACT

The use of studded tires became legal in Iowa in 1967 from November 1 of each year to April 1 of the following year. It was soon recognized that the wheel paths of some of the Interstate highways were beginning to exhibit increased wear. Also, there has been a continuing controversy regarding the benefits of studded tire use when all aspects of highway safety are considered.

The Iowa Highway Research Board approved a proposal titled, "Investigation of Pavement Wear in Relation to the Use of Studded Tires" in August of 1969 which was subsequently approved by the Iowa State Highway Commission.

One phase of the project was financial participation in a research project conducted by the American Oil Company on pavement wear due to studded tires for the State of Minnesota. This project was conducted at the laboratory and test track operated by the American Oil Company at Whiting, Indiana. The laboratory tests showed that studded tires without sand and salt abraded the pavement specimens more than 100 times as rapidly as un-studded tires with sand and salt.

The second phase was to be a limited investigation to determine pavement wear and studded tire usage in Iowa. This was to include a survey to determine studded tire usage in Iowa and measurement of transverse pavement profiles at selected locations where the pavement is subjected to a high volume of traffic. This report concerns this phase of the research project.

STUDDED TIRE USAGE

Surveys of studded tire use in Iowa were made by field personnel of the Iowa DOT in January of each of the years 1969 through 1978. The surveys were made by observing tires on vehicles parked in parking lots, both public and private and on the streets. To determine the statewide average, the state was divided into 27 areas. The number of cars using studded tires in each area was calculated based on the observations in each area.

SAFETY HAZARDS

Several unsafe conditions are caused by the use of studded tires. If a motorist places enough confidence in studded tires to drive 5 miles per hour faster than he would without studs, in terms of stopping distance, he is no better off than without studs.

Safety hazards such as premature loss of pavement lane markings, reduction in driving visibility due to increased splash and spray from water accumulating in rutted wheel tracks, hydroplaning, adverse steering effects caused by rutted wheel tracks and improper lateral placement of vehicles to avoid worn wheel tracks are all contributed to by wear caused by studded tires.

CONCLUSIONS AND RECOMMENDATIONS

Tire studs were introduced and sold on the basis of being a safety benefit to the motoring public. However, facts and conclusions of scientific studies (References 1, 2 and 3) have revealed that this equipment is creating more safety hazards than safety benefits. The conditions when studded tires may

offer safety benefits exist only about one percent of the time in Iowa while the rest of the time the studs may increase stopping distance. The small margin of braking benefit offered by studs during that one percent of the time can be nullified by an over-confident driver with an increased speed of only five miles an hour.

Studded tires have worn ruts in the Iowa pavements as deep as 5/16". As ruts develop due to studded tire wear, water does not properly drain from the surface. During warm months, water collects in the ruts and creates an unsafe condition conducive to hydroplaning. Splash and spray from the accumulated water also reduces driver visibility.

During the winter months, snow and ice cannot be removed from the rutted wheel path. This causes motorists to travel closer to the center line or edge of the pavement to avoid the snow-packed wheel path.

Based on the results of this research, it is recommended that the use of studded tires be prohibited in Iowa.